

REMARKS

Claim 6 has been amended to resolve an issue raised by the Examiner under 35 U.S.C. 112, second paragraph.

Entry of the above amendment is respectfully requested.

Restriction Requirement

On page 2 of the Office Action, in paragraph 1, the Examiner has set forth the restriction requirement originally issued by telephone, in which restriction is required between:

Group I, claims 1-2, drawn to an integrated thin-film solar cell.

Group II, claims 3-6, drawn to a process for producing an integrated thin-film solar cell.

The Examiner notes that a provisional election was made without traverse to prosecute the invention of Group II, claims 3-6, and indicates that affirmation of this election must be made by Applicants in replying to this Office Action.

In response, Applicants affirm the election of Group II, claims 3-6. Also, in view of the filing of the divisional Application No. 12/508,961, Applicants have canceled claims 1-2 from the present application.

Information Disclosure Statement

On page 4 of the Office Action, in paragraph 5, the Examiner indicates that the Information Disclosure Statement filed June 26, 2006 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance of each patent listed that is not in the English language.

In response, Applicants note that the first full paragraph on page 2 of the June 26, 2006 IDS referred to the English language version of the International Search Report as the concise explanation of the relevance of the foreign language documents. Further, Applicants note that MPEP 609.04(a)III states:

Where the information listed is not in the English language, but was cited in a search report or other action by a foreign patent office in a counterpart foreign application, the requirement for a concise explanation of relevance can be satisfied by submitting an English-language version of the search report or action which indicates the degree of relevance found by the foreign office. This may be an explanation of which portion of the reference is particularly relevant, to which claims it applies, or merely an "X", "Y", or "A" indication on a search report.

Thus, Applicants submit that the June 26, 2006 IDS satisfied the concise explanation requirement for foreign language documents, and Applicants therefore respectfully request that the Examiner consider the disclosed documents and return a fully initialed PTO/SB/08 form with the next communication from the PTO.

Rejection under 35 U.S.C. 112, Second Paragraph

On page 5 of the Office Action, in paragraph 7, claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

The Examiner's position is that the terms "good linearity" and "close positional relationship" are relative terms which render the claim indefinite. In particular, the Examiner indicates that these terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

reasonably apprised of the scope of the invention, which renders the spacing and shape of the grooves or gaps indefinite which renders the scope of the claim indefinite.

In response, and to expedite allowance, Applicants have amended claim 6 to delete the “good linearity” and “close positional relationship” recitations. Accordingly, Applicants submit that this rejection has been overcome, and withdrawal of this rejection is respectfully requested.

Art Rejections

On page 6 of the Office Action, in paragraph 12, claims 3-5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 2002-319686 to Shimakawa et al. On page 8 of the Office Action, in paragraph 13, claims 3-5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 10-200142 A to Toyoda et al. On page 11 of the Office Action, in paragraph 14, claim 6 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 2002-319686 to Shimakawa et al. On page 11 of the Office Action, in paragraph 15, claim 6 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 10-200142 A to Toyoda et al.

In response, Applicants note initially that they believe that the arguments made to overcome the Examiner's rejection of the basic Japanese application (JP 2003-428811) are also useful in the United States, too. In this regard, Applicants note that, in the corresponding Japanese application, claim 3 is granted according to the arguments. Thus, the arguments are set forth below.

Shimakawa et al. (JP 2002-319686) teach that it is known that a MoSe₂ layer is present between a layer of CIS or CIGSS and a lower electrode film of Mo and would undesirably raise

the connection resistance (contact resistance) between the lower and upper electrode films, thereby resulting in a solar cell of lower characteristics, which is a problem. Moreover, Shimakawa et al. disclose that, according to any known process, it had not been possible to remove satisfactorily the compound formed between the lower electrode 2 and the upper electrode 4, because mechanical patterning was conducted by using a needle etc. formed by an iron etc. (see paragraph [0007] of Shimakawa et al.).

Furthermore, Shimakawa et al. made it possible to remove the compound B layer (MoSe_2 layer) formed between the first electrode film 11 (lower electrode film of Mo) and the thin film 12 (of CIS or CIGSS), according to Shimakawa et al. (see paragraph [0021]).

Thus, in Shimakawa et al., it is disclosed that because a MoSe_2 layer, which would undesirably raise the connection resistance (contact resistance) thereby resulting a solar cell of lower characteristics, is present between a layer of CIS or CIGSS and a lower electrode film of Mo, the connection resistance is lowered by removing the MoSe_2 layer, thereby preventing a reduction in characteristics of a solar cell.

Toyoda et al. (JP 10-200142) disclose that, in patterning by mechanical scribing of a laminate of a CIS film 3 and a CdS film 4, the CIS or MoSe_x remaining undesirably produces an increased contact resistance between ZnO film and Mo film, and brings about a contact failure therebetween, which is a problem (see paragraph [0008]).

Moreover, Toyoda et al. teach patterning the CIS film 3 and CdS film 4 by an end mill rotating at a high speed to prevent any CIS or MoSe_x from remaining thereafter.

Thus, Toyoda et al. disclose that if MoSe_x remains on a surface of the Mo film 2, the contact failure as above occurs. Accordingly, they also teach removing any MoSe_x from the

surface of the Mo film 2 by end mill patterning to prevent any contact failure and achieve a good contact between the Mo film 2 and the ZnO film 5.

On the other hand, the present invention positively utilizes an ultrathin film layer (of molybdenum selenide or sulfide) formed secondarily between the metal back electrode layer and the light absorbing layer, as a solid lubricant in a patterning step.

However, Shimakawa et al. and Toyoda et al. teach removing or preventing such an ultrathin film layer (of molybdenum selenide or sulfide) as it brings about a contact failure or an increase in connection resistance. Neither Shirnakawa et al nor Toyoda et al. entirely disclose and suggest the technical idea of the present invention that the ultrathin film layer (of molybdenum selenide or sulfide) is positively used as a solid lubricant in a patterning step.

Accordingly, Applicants strongly believe that the present invention is novel and unobvious in view of the cited documents, and thus withdrawal of these rejections is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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